Claims:

1. A dual articulating hinge for use in a volume measurement chamber, the hinge comprising:

(a) a first hinge leaf, coupled to a first structural component of the measurement chamber;

(b) a second hinge leaf, coupled to a second structural component of the measurement chamber;

(c) a hinge coupling strut;

(d) a first hinge pin for joining said first hinge leaf to said hinge coupling strut at a first hinge;

(e) a second hinge pin for joining said hinge coupling strut to said second hinge leaf at a second hinge; and,

(f) a spacer for defining a set distance between said first hinge leaf and said second hinge leaf.

2. The hinge of claim 1, wherein rotational movement of said first hinge defines a first degree of articulation, and rotational movement of said second hinge defines a second degree of articulation.

3. The hinge of claim 1, wherein the first hinge pin joins said first hinge leaf to said coupling strut at a proximal end of said coupling strut, and wherein the second hinge pin joins said coupling strut to said second hinge leaf at a distal end of said coupling strut.

4. The hinge of claim 3, wherein the distal end of said coupling strut is joined to said second hinge leaf at a point between a proximal end and a distal end of said second hinge leaf.

5. The hinge of claim 1, wherein the spacer is adjustable.

6. The hinge of claim 5, wherein the spacer is a bolt.

7. The hinge of claim 5, wherein spacer is a screw.

8. The hinge of claim 1, wherein the spacer is a raised surface protruding from the first hinge leaf.

9. The hinge of claim 1, further comprising:

a load bearing surface on said second hinge leaf for bearing the load presented at said spacer.

10. The hinge of claim 9, wherein the load bearing surface is a roller bearing mounted about said second hinge pin.

11. The hinge of claim 10, wherein the roller bearing is capable of rotation about said second hinge pin.

12. The hinge of claim 2, further comprising:

means for resisting motion in said second degree of articulation.

13. The hinge of claim 12, wherein the means for resisting motion in said second degree of articulation comprises:

a hinge spring; and

a retaining screw passing through the bore of said spring, and mounted to said second hinge leaf.

14. The hinge of claim 13, wherein the retaining screw compresses said spring during said second degree of articulation.

15. The hinge of claim 14, further comprising:

one or more set screws, mounted to said coupling strut, for setting a minimum distance between said coupling strut and said second hinge leaf

16. The hinge of claim 15, wherein the one or more set screws precompresses said hinge spring.

17. The hinge of claim 12, wherein the means of resisting motion in the second degree of articulation comprises:

a torsion spring mounted about said second hinge pin.

18. The hinge of claim 12, wherein the means of resisting motion in the second degree of articulation comprises:

a leaf spring, coupled to said upper hinge leaf.

19. A laterally compliant magnetic latch for use in a volume measurement chamber, comprising:

a magnetic latch face coupled to a first structural component of the measurement chamber, said latch face including:

a sleeve; and

a roller ball mounted in said sleeve, and capable of rotation within said sleeve;

a magnet housing coupled to a second structural component of the measurement chamber, said housing including:

an electromagnet;

an approximately planar surface; and

an insert in said planar surface,

wherein said insert makes contact with said roller ball when said latch is in the closed position,

and wherein said planar surface and said magnetic latch face form a plane of closure.

20. The latch of claim 19, wherein said magnetic latch face is circular.

21. The latch of claim 19, wherein said sleeve is mounted in the center of said latch face.

22. The latch of claim 19, wherein said roller ball is made of carbide.

23. The latch of claim 19, wherein said roller ball is made of hardened steel.

24. The latch of claim 19, wherein said insert is made of the same material as said roller ball.

25. The latch of claim 19, wherein said latch face makes contact with said magnet housing at a point defined by said roller ball and said insert.

26. The latch of claim 19, wherein said electromagnet further comprises:

an outer magnet pole;

an inner magnet coil; and

a magnet coil.

27. The latch of claim 26, wherein the approximately planar surface is comprised of the ends of said outer magnet pole, said inner magnet coil; said magnet coil, and said insert that are proximal to said latch face.

28. A pivotally mounted door assembly for a volume measurement chamber, the assembly comprising:

a hinge bar;

a door lid; and

a pivotal joint connecting said hinge bar to said door lid;

wherein said hinge bar is coupled to said chamber to allow for opening and closing of the door assembly.

29. The assembly of claim 28, wherein said door lid is mounted symmetrically with respect to said pivotal joint.

30. The assembly of claim 28, wherein a seal is mounted about the circumference of said door lid.

31. The assembly of claim 28, further comprising:

a spring mounted about said pivotal joint;

wherein said spring applies a known force to compress said door lid against an opening in said chamber.

32. The assembly of claim 28, wherein the door lid further comprises:

a set of standoffs offset from an outer circumference of said door lid.

33. The assembly of claim 32, wherein said spring centers said door lid about said standoffs when said assembly is in the closed position.

34. The assembly of claim 28, wherein said hinge bar is fastened to said chamber by a magnetic latch when said assembly is in the closed position.

35. The assembly of claim 28, further comprising: a shock absorber coupled to said pivotal joint and said hinge bar.

36. The assembly of claim 28, wherein the pivotal joint comprises a ball joint.

37. The assembly of claim 28, wherein the pivotal joint comprises a universal joint.

38. The assembly of claim 28, wherein the pivotal joint comprises a point pin mounted in a hole in said hinge bar.

39. A chamber for conducting repeatable volume measurements, the chamber comprising:

a chamber wall;

a chamber door; and

a dual articulating hinge affixing said chamber door to said chamber wall.

40. The chamber of claim 39, further comprising:

a gasket affixed about the circumference of said chamber door, said gasket providing a seal between said chamber door and said chamber wall.

41. The chamber of claim 39, wherein the dual articulating hinge further comprises:

a first hinge leaf;

a second hinge leaf;

a hinge coupling strut;

a first hinge pin for joining said first hinge to said hinge coupling strut at a first hinge;

a second hinge pin for joining said hinge coupling strut to said second hinge leaf at a second hinge; and,

a spacer for defining a set distance between said first hinge leaf and said second hinge leaf.

42. The chamber of claim 39, wherein said hinge further comprises:

a load bearing surface on said second hinge leaf for bearing the load presented at said spacer.

43. The chamber of claim 39, wherein said load bearing surface is a roller bearing mounted about said second hinge pin.

44. The chamber of claim 39, wherein said hinge further comprises:

a hinge spring; and

a retaining screw passing through the bore of said spring, and mounted to said second hinge leaf.

45. The chamber of claim 44, wherein the retaining screw compresses said spring in a degree of articulation defined by motion about said second hinge pin.

46. The chamber of claim 45, further comprising: a latch for fastening said chamber door to said chamber wall when said door is in a closed position

47. The chamber of claim 46, wherein said latch is a laterally compliant magnetic latch, comprising:

a magnetic latch face, said latch face including:

a sleeve; and

a roller ball mounted in said sleeve, and capable of rotation within said sleeve;

a magnet housing, said housing including:

an electromagnet;

a planar surface; and

an insert in said planar surface, wherein said insert makes contact with said roller ball when said latch is closed, and wherein the planar surface of said magnet housing and the magnetic latch face form a plane of closure.

48. The chamber of claim 47, wherein said latch face makes contact with said magnet housing at a point defined by said roller ball and said insert

49. A chamber for conducting repeatable volume measurements, the chamber comprising:

a chamber wall;

a chamber door; and

a laterally compliant magnetic latch for fastening chamber door to chamber wall when said door is in a closed position.

50. The chamber of claim 49, wherein said latch further comprises:

a magnetic latch face, said latch face including:

a sleeve; and

a roller ball mounted in said sleeve, and capable of rotation within said sleeve;

a magnet housing, said housing including:

an electromagnet;

a planar surface; and

an insert in said planar surface, wherein said insert makes contact with said roller ball when said latch is closed, and wherein the planar surface of said magnet housing and the magnetic latch face form a plane of closure.

51. The chamber of claim 50, wherein said latch face makes contact with said magnet housing at a point defined by said roller ball and said insert.

52. The chamber of claim 49, further comprising:

a gasket affixed about the circumference of said chamber door, said gasket providing a seal between said chamber door and said chamber wall.

53. The chamber of claim 49, further comprising a hinge affixing said chamber door to said chamber wall, wherein said door can rotate about said hinge.

54. The chamber of claim 53, wherein said hinge is a dual articulating hinge, comprising:

a first hinge leaf;

a second hinge leaf;

a hinge coupling strut;

a first hinge pin for joining said first hinge to said hinge coupling strut at a first hinge;

a second hinge pin for joining said hinge coupling strut to said second hinge leaf at a second hinge; and,

a spacer for defining a set distance between said first hinge leaf and said second hinge leaf.

55. The chamber of claim 54, wherein said hinge further comprises:

a load bearing surface on said second hinge leaf for bearing the load presented at said spacer.

56. The chamber of claim 55, wherein said load bearing surface is a roller bearing mounted about said second hinge pin.

57. The chamber of claim 55, wherein said hinge further comprises:

a hinge spring; and

a retaining screw passing through the bore of said spring, and mounted to said second hinge leaf.

58. The chamber of claim 57, wherein the retaining screw compresses said spring in a degree of articulation defined by motion about said second hinge pin.

59. A method for providing repeatable closure in a plethysmographic chamber, the method comprising:

providing a door for said chamber, to provide for ingress and egress to said chamber;

hinging the door to the chamber with a hinge having a first and second degrees of articulation;

rotating the door about said first degree of articulation;

providing a spacer defining the end of the first degree of articulation, and further defining a pivot point for said second degree of articulation; and

rotating the door about the second degree of articulation.

60. The method of claim 59, further comprising:

fastening the door to the chamber with a magnetic latch at the end of said second degree of articulation.

61. The method of claim 59, further comprising:

inflating a gasket mounted on an inner perimeter of said door for creating a seal between said door and said chamber

62. The method of claim 59, wherein providing a spacer further comprises:

adjusting the height of said spacer, to set a desired gap between said hinge and said door when said door is in a closed position.

63. The method of claim 59, further comprising:

affixing a first latch element to said chamber

door;

affixing a second latch element to said chamber wall;

rotating said door about said first and second degrees of articulation until said door is in a closed position, such that said first and second latch elements come in contact;

applying a magnetic force between said first and second latch elements;

spacing said first and second latch elements with a rotational member, wherein the rotational member allows lateral movement between first and second latch surfaces.

64. A method for providing repeatable door closure in a plethysmographic chamber, the method comprising:

providing a door for said chamber, to provide for ingress and egress to said chamber;

affixing a first latch element to said chamber door;

affixing a second latch element to said chamber wall;

closing said door, such that said first and second latch elements come in contact;

applying a magnetic force between said first and second latch elements;

spacing said first and second latch elements with a rotational member, wherein the rotational member allows lateral movement between first and second latch surfaces.

65. The method of claim 64, wherein said first and second latch elements come in contact at a point defined by said rotational member.

66. The method of claim 64, further comprising:

inflating a gasket mounted on an inner perimeter of said door for creating a seal between said door and said chamber.

67. A method for providing repeatable closure in a plethysmographic chamber, the method comprising:

providing a door for said chamber, to provide for ingress and egress to said chamber;

affixing a first latch element to said chamber door;

affixing a second latch element to said chamber wall;

closing said door, such that said first and second latch elements come in contact;

applying a magnetic force between said first and second latch elements;

providing for lateral compliance in a plane of closure defined by said first and second latch elements.

68. A dual articulating hinge for use in a volume measurement chamber, the hinge comprising:

(a) a first hinge leaf, coupled to a first structural component of the measurement chamber;

(b) a second hinge leaf, coupled to a second structural component of the measurement chamber;

(c) a first hinge coupling a leaf spring to the first hinge leaf, wherein the leaf spring further couples said first hinge to said second hinge leaf; and,

(d) a spacer for defining a set distance between said first hinge leaf and said second hinge leaf.

69. The hinge of claim 68, wherein rotational movement of said first hinge defines a first degree of articulation, and movement of said second hinge leaf with respect to said leaf spring defines a second degree of articulation.

70. The hinge of claim 68, wherein the first hinge joins said first hinge leaf to said leaf spring at a proximal end of said leaf spring, and wherein the leaf spring is coupled to said second hinge leaf at a distal end of leaf spring.

71. The hinge of claim 70, wherein the distal end of said leaf spring is coupled to said second hinge leaf at a point between a proximal end and a distal end of said second hinge leaf.

72. The hinge of claim 68, wherein the spacer is adjustable.

73. The hinge of claim 72, wherein the spacer is a bolt.

74. The hinge of claim 72, wherein spacer is a screw.

75. A method for providing repeatable closure in a plethysmographic chamber, the method comprising:;

providing a door assembly for said chamber, to provide for ingress and egress to said chamber;

hinging the door assembly to the chamber, to allow for opening and closing of the door assembly;

pivotally mounting a door lid to the door assembly, wherein the door lid closes an opening in the chamber when the door assembly is in the closed position; and

closing the door assembly.

76. The method of claim 75, further comprising:

coupling the door lid to the door assembly with a spring